

**ABSTRACT**

A suspended-load backpack designed to permit the load to move relative to the backpack frame during walking and running so that the large movements between the load and the frame of the backpack reduce the fluctuations of absolute vertical motion of the load. Because the hip (and thus the pack frame) go up and down a good deal during walking, a large relative movement between the frame and the load reduces the absolute excursion of the load. This movement may be, in turn, transferred to a motor through, for example, a rack and pinion gear, to convert the mechanical movement to electrical energy. The movement may also be converted to electrical energy by using an electroactive polymer (EAP) to connect the suspended load to the frame. Such designs allow the load to move in a controlled fashion to prevent the patient from losing his or her balance as the load moves up and down along the backpack frame. Such movement of the suspended-load relative to the frame also reduces the forces on the wearer's shoulders while walking or running, thus reducing the likelihood of orthopedic injury.